A STUDY OF REFLEXES OF THE LOWER EXTREMITIES IN SIXTY CASES OF PARESIS, WITH A SPECIAL REFERENCE TO THE PARADOXICAL REFLEX.*

By Alfred Gordon, M.D.,

ASSOCIATE IN NERVOUS AND MENTAL DISEASES, JEFFERSON MEDICAL COLLEGE; EXAMINER OF THE INSANE AT THE PHILADELPHIA HOSPITAL, ETC.

A systematic study of cutaneous and deep reflexes in paretic dementia has been made by very few observers, and that of Babinski's sign particularly only by a few isolated writers. The consensus of opinion is that the "phénomène des orteils" in paresis is an exception. Very recently Robert and Fournial (*Revue Neurologique,* No. 21, 1906) studied 66 cases and found Babinski's sign present only in one case. The reason of this rarity it is apparently difficult to explain, as on one hand involvement of the motor tract in paresis is the rule, and on the other Babinski's reflex is unquestionably a sign of an involvement of the motor pathway in its central or terminal ends.

An ensemble study of all the reflexes well known to be the expression of disease of the motor tract appeared to me to be of some scientific interest.

As I have shown from my first clinical studies (Journ. of Nerv. and Ment. Dis., July, 1906), and subsequently from the anatomo-clinical observations that the paradoxical reflex is "a sign of irritation or early stage of a lesion of the motor tract," it occurred to me that a study of this sign in a disease in which Babinski against all expectations is absent, may be of some pathogenetic value.

Anglade in 1898 (*Arch. de Neurologie*), Wyruboff in 1900 (*Revue Neurol.*), have shown on a very large number of pathological specimens that the participation of the cord in paresis is a constant fact, and while the posterior columns are very markedly affected, the pyramidal tracts are to a lesser degree, but nevertheless invariably involved. Wyruboff's study shows that all paretic cases from the anatomo-clinical standpoint can be divided into three groups.

(1) First concerns cases characterized by markedly ex-

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aggerated knee-jerks and anatomically by a degeneration of the posterior columns in the thoracic region and a recent degeneration of the pyramidal bundles.

(2) In the second group the knee-jerks are abolished, which corresponds to a considerable degeneration of the posterior columns in the lumbar regions and some degeneration of the pyramidal tracts.

(3) In the third group there is a marked degeneration of the posterior columns through the entire cord and again some changes in the pyramidal bundles.

Klippel, who made extensive studies of paresis, is also of the opinion that a degeneration of the motor neurone in general and of its portion in the cord particularly is a constant phenomenon in paretic dementia.

The conclusion at which one can arrive from these studies is that while the motor pathway is always involved, nevertheless it is only to a very slight degree in the majority of cases. As Babinski's sign is usually the clinical expression of a well-defined degenerative lesion of the motor tract, the very moderate degree of pyramidal involvement will perhaps satisfactorily explain the rarity of the "phénomène des orteils" in paresis.

On the other hand the study of the paradoxical reflex in organic nervous diseases suggests very strongly that it is the expression of a slight or early involvement of the motor tract. This is proven beyond any doubt, I believe, by the anatomical cases reported: one by Dercum (JOURN. NERV. AND MENT. DIS., Sept., 1906, p. 593), and the other by myself (*Revue Neurol.*, No. 22, 1906).

The presence of this reflex in a large number of paretic cases and the comparatively slight involvement of the pyramidal tracts are therefore highly interesting and logically must be considered more than a simple coincidence. In the study of 60 well developed cases of paresis I found the paradoxical reflex present in 42 instances: in 35 cases on both sides and in 7 only on one side.

The reflex was present in 39 cases together with increased knee-jerks and in 3 cases with absent knee-jerks. The latter fact is quite remarkable for this reason, that in all my previous studies the paradoxical reflex was always found to be associated with exaggerated patellar tendon reflex.

This anomaly is only apparent. The pathological studies of the above writers show that even in cases of paresis of tabetic type with loss of knee-jerks, alongside of total degeneration of the posterior columns, there is invariably also some involvement of the pyramidal fibers..

In two cases with increased knee-jerks the paradoxical reflex was absent. In one case with normal knee-jerks the paradoxical was also absent.

In the seven cases with one-sided paradoxical reflex, the latter corresponded to an exaggerated knee-jerk which was present on the same side and absent on the other.

Babinski's sign was present only in 3 cases on both sides and one side in 4 cases. It coincided with spasticity and markedly exaggerated knee-jerks.

The antagonistic relation of Babinski's and paradoxical reflexes observed by me in my previous studies is fully corroborated also in my present investigation. In all cases except two where Babinski was present, the paradoxical was absent, and vice versa.

Oppenheim's reflex deserves special mention. Some neurologists expressed the opinion at the time of my first communication that the paradoxical reflex is perhaps a modification of Oppenheim's. In my second series of organic cases reported to the Philadelphia Neurological Society in December, 1905 (JOURN. OF NERV. AND MENT. DIS., July, 1906), Oppenheim's reflex was absent in 41 instances out of 58; only in 5 cases it was present together with the Babinski and paradoxical reflexes. In the two pathological cases mentioned above the paradoxical reflex was conspicuous, all others, except increased knee-jerks, were absent, and operative procedures were decided upon because of the exclusive presence of the paradoxical reflex. One case was seen by Keen, Dercum and myself, the other by Mills, Dercum, Da Costa and myself. In my present study of paresis I laid special stress upon the relation of the paradoxical reflex to Oppenheim's, and the result was this, that while the former was present in 42 cases, Oppenheim's only in 8 cases, in 4 of which it was bilateral and in 4 unilateral.

Ankle-clonus was present only in 11 cases, in most of which it was slight, and only in one case pronounced.

CONCLUSIONS

The present study appears to me to be of certain importance for the following reasons:

The old triad of reflex phenomena, viz., exaggerated knee-jerks, ankle-clonus and Babinski's sign, which we are accustomed to find in hemiplegia or in any other organic disease with a distinct degenerative lesion in the motor pathway, is here markedly dissociated. While the first is present in the majority of my cases, the other two are rare. Of the two more recently described reflexes, Oppenheim's is also rare, while the paradoxical is frequent.

In view of the fact that the pathological studies of competent observers show a constant presence of motor fibers' lesion, and that the latter is in the majority of cases only very slight,— the rarity of Babinski's and Oppenheim's reflex, also of ankle-clonus, and the frequency of the paradoxical phenomenon acquire I believe for this reason a valuable clinical significance.

These observations were made in the presence of Drs. H. M. Stewart and B. Robinson, internes at the Philadelphia Hospital. I am indebted to Dr. Hawke for the courtesy extended to me.